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"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
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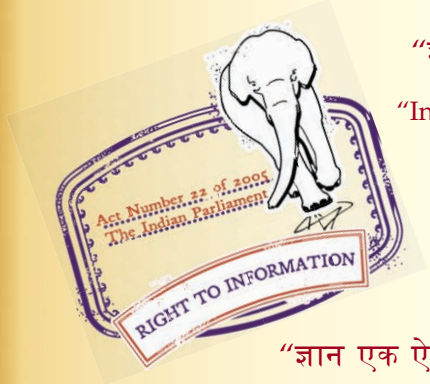
IS 14712 (1999): Wrought Aluminium and Its Alloys - Chequered/tread Sheets for General Engineering Purposes [MTD 7: Light Metals and their Alloys]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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भारतीय मानक

पिटवाँ ऐल्युमिनियम एवं उसकी मिश्रधातुएँ — सामान्य इंजीनियरी प्रयोजनों के लिए चलने के लिए प्रयुक्त चारखानेदार चद्दरें — विशिष्टि

Indian Standard

WROUGHT ALUMINIUM AND ITS ALLOYS — CHEQUERED/TREAD SHEETS FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

ICS 77.120.10

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 1999 Price Group 2

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Light Metals and Their Alloys Sectional Committee had been approved by the Metallurgical Engineering Division Council.

The chequered sheets are finding increasing use as floorings of transport vehicles and railway coaches.

In the preparation of this standard assistance has been derived from the following standards and data:

a) Aluminium Tread Plate by Vereiniote Metallwerke Ran Shoften Brandorf Ag, A-5282 Braunau-Ranshoften. Austria.

b) DIN:59605 Embossed plate and sheet of wrought aluminium alloys.

c) Aluminium Association Standards and Data (Metric) 1986.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 MARCH 2007
TO
IS 14712 : 1999 WROUGHT ALUMINIUM AND ITS ALLOYS — CHEQUERED/TREAD SHEETS FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

(*Page* 1, *clause* **6.1**) — Substitute the following for the existing matter:

'The material used for making chequered/tread sheets shall conform to the Grades and Alloys 19 000, 31 000, 52 300, 52 300B, 64 430, 65 028 and 65 032, and specified in IS 737.'

(*Page* 4, *Table* 1) — Substitute the following for the existing:

Sl No.	Designation	Condition	0.2 Percent Proof Stress MPa	Tensile Strength MPa		Elongation on Gauge Length of 50 mm Percent for Thickness		
						Over 0.8 to 1.3 mm	Over 1.3 to 2.6 mm	Over 2.6 to 3.5 mm
			Min	*Min*	*Max*	*Min*	*Min*	*Min*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	19 000	F	-	105	-	-	-	-
		H x 4	-	105	140	4	5	5
		H x 6	-	125	150	3	4	4
ii)	31 000	F	-	130	-	-	-	-
		H x 4	-	130	180	4	5	5
		H x 6	-	250	195	3	4	4
iii)	52 300	F	-	250	-	-	-	-
iv)	52 300B	F	-	230	-	-	-	-
v)	64 430	T 4	115	200	-	15	15	15
		T 6	250	295	-	5	5	6
vi)	65 028	T 4	110	200	-	15	15	1
vii)	65 032	T 6	235	280	-	5	5	6

NOTES
1 1 MPa = 1N/mm^2= 0.102 kgf/mm^2
2. For thickness 2.6 mm and less, elongation values are for guidance only.
3 For 'F' temper properties are for guidance only.

(MTD 7)

Reprography Unit, BIS, New Delhi, India

Indian Standard

WROUGHT ALUMINIUM AND ITS ALLOYS — CHEQUERED/TREAD SHEETS FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

1 SCOPE

This standard covers the requirement of wrought aluminium alloy chequered/tread sheet having base thickness 0.80 to 3.50 mm with following four patterns:

i) Diamond,
ii) Single bar,
iii) Two bar, and
iv) Five bar.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
737 : 1986	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes (*third revision*)
1599 : 1985	Method for bend test (*second revision*)
1608 : 1995	Mechanical testing of metals — Tensile testing (*second revision*)
2676 : 1981	Dimensions for wrought aluminium and aluminium alloy sheet and strip (*first revision*)
5047	Glossary of terms relating to aluminium and aluminium alloys:
(Part 1) : 1986	Unwrought and wrought metal (*second revision*)
(Part 2) : 1979	Plant and operation, thermal treatment, control and testing finishing
(Part 3) : 1979	Geometric properties and tolerances, structural and surface defects
5052 : 1993	Aluminium and its alloys — Temper designations (*first revision*)
10259 : 1982	General conditions of delivery and inspection of aluminium and aluminium alloy product

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions of terms given in IS 5047 (Part 1), 5047 (Part 2), and 5047 (Part 3) and the following shall also apply.

3.2 Chequered/Tread Sheet — A sheet upon which a raised, non-slip pattern has been impressed on one face by rolling.

3.3 Pattern — An artistic mechanical design in the form of a diamond/single bar/two bar/five bar.

3.4 Base Thickness — Thickness of the sheet that serves as a base for the pattern.

3.5 Pattern Height — Height of the raised pattern above the base sheet. Hence pattern height shall be difference between total thickness and base thickness.

4 SUPPLY OF MATERIAL

General requirements relating to the supply of aluminium and aluminium alloy chequered/tread sheet shall conform to IS 10259.

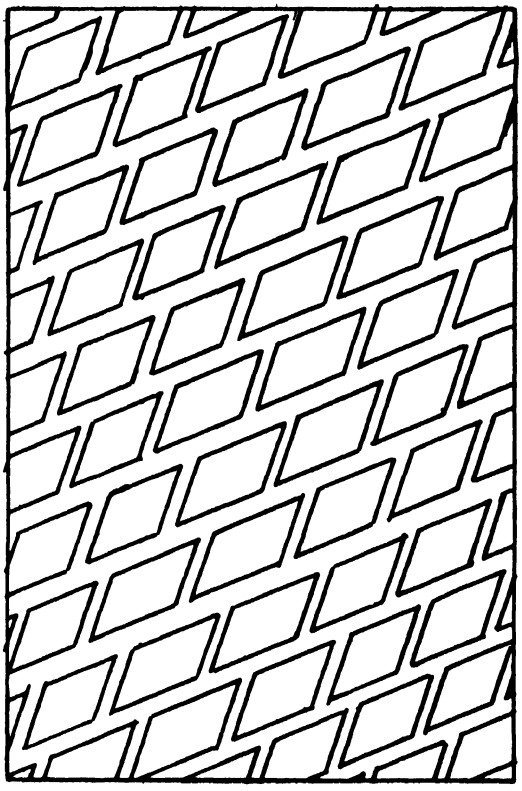
5 PATTERN

Patterns of the chequered/tread sheet may preferably be one of the four types as shown in the Fig. 1. However, if agreed to between the purchaser and the manufacturer other patterns can also be used.

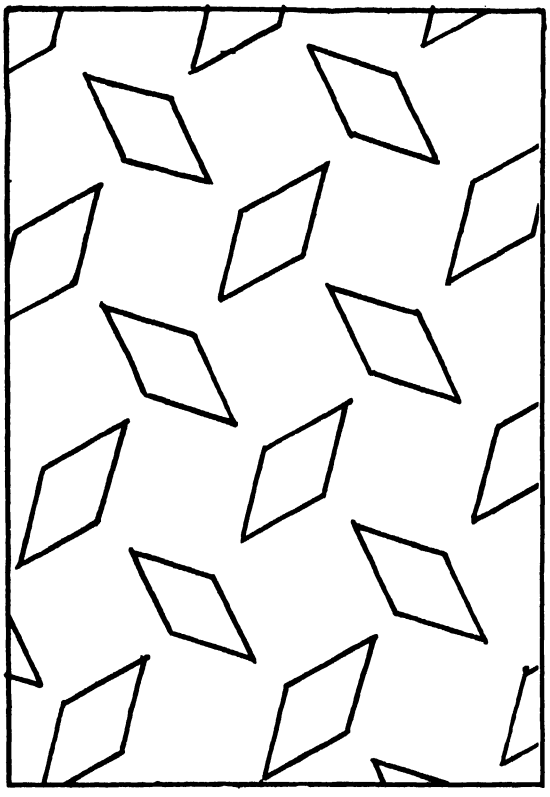
6 MATERIAL

6.1 The material used for making chequered/tread sheets shall conform to the Grade and Alloy 19 000, 31 000, 64 430, 65 028 and 65 032 as specified in IS 737.

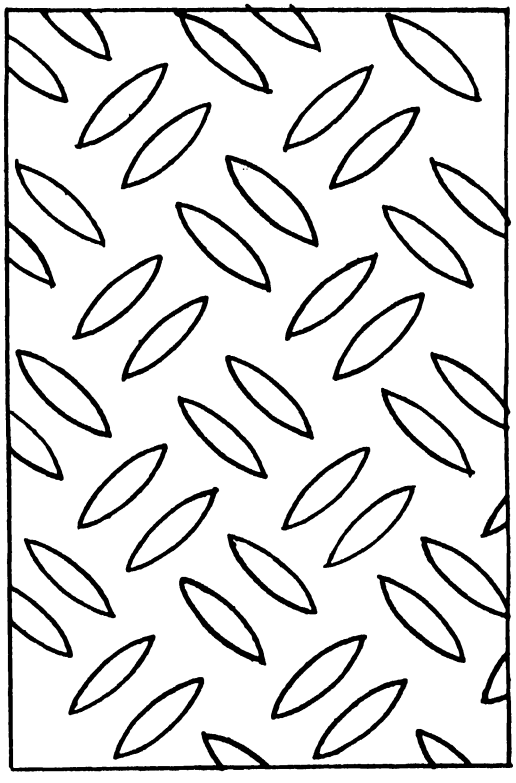
6.2 The material shall be supplied in condition as required by the purchaser. While specifying the condition, the temper designations laid down in IS 5052 shall be followed.



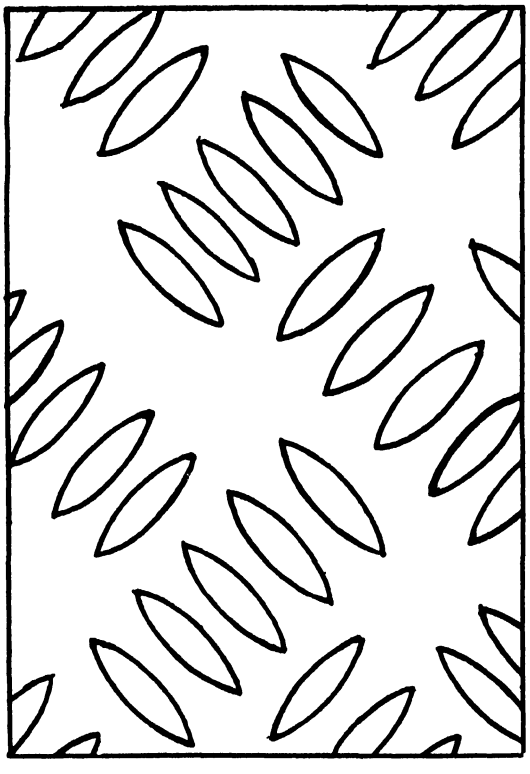
i) Diamond



ii) Single Bar



iii) Two Bar



iv) Five Bar

FIG. 1 PATTERNS OF THE CHEQUERED/TREAD SHEETS

7 TENSILE PROPERTIES

7.1 The tensile properties of the chequered/tread sheet shall comply with the requirements given in Table 1.

7.1.1 The tensile test shall be carried out and proof stress determined thereby in accordance with IS 1608.

7.1.2 The tensile test piece shall be machined to obtain a flat surface. However, tensile test piece without machining the raised pattern can be used provided the pattern is not continuous along the length of the piece. In the latter case the base thickness shall be used for calculating the cross-sectional area of the tensile test piece. In case of dispute, tensile properties obtained on machined test specimen shall be final.

7.2 Bend Test

If agreed to between the purchaser and the manufacturer bend test shall be carried out for material in T4 condition as per IS 1599. The sample shall be bent through an angle of 90° over a mandrel having radius of 4t. While bending the rolled in pattern shall be on the out side. After bending no crack shall be visible on the outer surface of the bend test piece.

8 DIMENSIONS AND TOLERANCES

8.1 Base thickness tolerances for chequered/tread sheet shall be as per the thickness of sheet and strip specified in Table 5 of IS 2676.

8.2 Tolerances for pattern height shall be as per Table 2.

8.3 Shearing tolerances on length and width of the chequered/tread sheet shall be as per Table 1 of IS 2676.

8.4 Squareness Tolerances for Chequered/ Tread Sheet

The difference of the two diagonal distances between opposite corner of any sheet shall not exceed total tolerances on the length of the chequered/tread sheet, that is, sum of positive and negative tolerances.

8.5 Straightness Tolerance (Curvature of Cut Edges)

The permissible deviation of the cut edges from the straight line must not exceed the values as given in Table 3.

9 FREEDOM FROM DEFECTS

The chequered/tread sheet shall be clean and reasonably free from harmful defects.

10 SELECTION OF TEST SAMPLE

Selection of test sample shall be as per IS 737.

11 RETEST

11.1 Should any of the test pieces first selected fail to pass the tensile test, two further samples from the same batch shall be selected for testing.

11.2 For heat-treatable alloys, the supplier shall have the right, if he so desires, to reheat-treat the material before the two further samples are selected.

11.3 Should the test pieces from both these additional samples pass, the batch represented by the test samples shall be deemed to comply with this standard. Should the test pieces from either of these additional samples fail, the batch represented by the test samples shall be deemed not to comply with this standard.

12 MARKING

12.1 Each package of chequered/tread sheet may be suitably marked for identification with the name of the manufacturer, grade and condition of the material and batch number. The supplier shall furnish a certificate that the material supplier complies with the requirements of this specification.

12.2 The material may also be marked with the Standard Mark.

12.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 1 Tensile Properties

(*Clause* 7.1)

Sl No.	Designation	Condition	0.2 Percent Proof Stress, MPa	Tensile Strength, MPa		Elongation on Gauge Length of 50 mm, Percent for Thickness		
						Over 0.8 to 1.3 mm	Over 1.3 to 2.6 mm	Over 2.6 to 3.5 mm
			Min	*Min*	*Max*	*Min*	*Min*	*Min*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	19 000	F	–	105	–	–	–	–
		H x 4	–	105	140	4	5	5
		H x 6	–	125	150	3	4	4
ii)	31 000	F	–	130	–	–	–	–
		H x 4	–	130	180	4	5	5
		H x 6	–	150	195	3	4	4
iii)	64 430	T 4	115	200	–	15	15	15
		T 6	250	295	–	5	5	6
iv)	65 028	T 4	110	200	–	15	15	1
v)	65 032	T 6	235	280	–	5	5	6

NOTES

1 1 MPa = 1 N/mm^2 = 0.102 kgf/mm^2.

2 For thickness 2.6 mm and less, elongation values are for guidance only.

3 For 'F' temper properties are for guidance only.

Table 2 Pattern Height Tolerances for Various Base Thickness of Chequered/Tread Sheet

(*Clause* 8.2)

All dimensions in millimetres.

Sl No.	Base Thickness	Pattern Height		
		Nominal	Tolerances	
			Plus	Minus
(1)	(2)	(3)	(4)	(5)
i)	0.8	0.5	+0.3	–0.3
ii)	1.0	0.5	+0.3	–0.3
iii)	1.5	1.0	+0.3	–0.5
iv)	2.0	1.0	+0.4	–0.4
v)	2.5	1.0	+0.4	–0.4
vi)	3.0	1.0	+0.5	–0.3
vii)	3.5	1.0	+0.6	–0.2

NOTE — For intermediate base sizes pattern height tolerances shall be taken as for the next higher size in the table.

Table 3 Tolerances for Curvature of Cut Edges of Chequered/Tread Sheet

(*Clause* 8.5)

All dimensions in millimetres.

	Allowable Deviation from Straightness of Width and Length			
Length	Up to 1 000	Over 1 000 up to 2 000	Over 2 000 up to 3 000	Over 3 000 up to 4 000
Deviation	3	4	5	6

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act,* 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc : No. MTD 7 (4025).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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